

10th Class 2021

Chemistry	Group-II	Paper-II
Time: 1.45 Hours	(Subjective Type)	Marks: 48

(Part-I)

2. Write short answers to any FIVE (5) questions: (10)

(i) What is meant by static equilibrium?

Ans When reaction ceases to proceed, it is called static equilibrium. This happens mostly in physical phenomenon. For example, a building remains standing rather than falling down because all the forces acting on it are balanced. This is an example of static equilibrium.

(ii) Give any two characteristics of reversible reaction.

Ans Following are two characteristics of reversible reaction:

1. A reversible reaction can never go to completion.
2. Usually, it can be carried out in a closed vessel.

(iii) Define reversible reaction and give example.

Ans A reaction in which the products can recombine to form reactants are called reversible reaction. These reactions never go to completion. These are represented by a double arrow (\rightleftharpoons) between reactants and products.

(iv) Define acid and base according to Arrhenius concept.

Ans According to Arrhenius concept:

Acid is a substance which dissociates in aqueous solution to give hydrogen ions.

On the other hand, base is a substance which dissociates in aqueous solution to give hydroxide ions.

(v) Write two uses of acetic acid.

Ans The uses of acetic acid are as follows:

1. It is used for flavouring food and food preservation.

2. It is used to cure the sting of wasps.

(vi) Define pH. What is the pH of pure water?

Ans pH is the negative logarithm of molar concentration of the hydrogen ions, i.e., $\text{pH} = -\log [\text{H}^+]$.

The pH value of pure water is 7.

(vii) Define functional group with an example.

Ans An atom or group of atoms or presence of double or triple bond, which determines the characteristic properties of an organic compound is known as the functional group. For example, $-\text{OH}$ group is the functional group of alcohols.

(viii) What is the difference between n-propyl and iso-propyl radicals. Explain with structure.

Ans Difference between n-propyl and iso-propyl radicals:

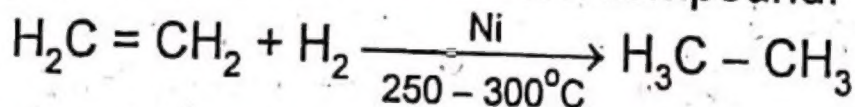
n-propyl radicals	iso-propyl radicals
1. When terminal H is removed from propane, it is called n-propyl radical.	1. When hydrogen from central carbon of propane is removed, it is called iso-propyl radical.
2. $\text{CH}_3-\text{CH}_2-\text{CH}_3$ (Propane) ↓ Removal of terminal H $\text{CH}_3-\text{CH}_2-\text{CH}_2$ -(n-propyl radical)	2. $\text{CH}_3-\text{CH}_2-\text{CH}_3$ (Propane) ↓ Removal of central H $\text{CH}_3-\text{C}-\text{CH}_3$ (iso-propyl radical)

3. Write short answers to any FIVE (5) questions: (10)

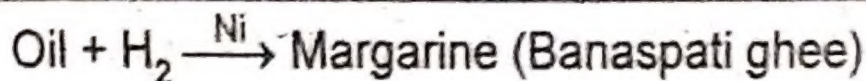
(i) What do you know about hydrogenation of alkenes? Give an example.

Ans Hydrogenation of Alkenes:

Hydrogenation means addition of molecular hydrogen to an unsaturated hydrocarbon in the presence of a catalyst (Ni, Pt) to form saturated compound.



On industrial scale, this reaction is used to convert vegetable oil into margarine (Banaspati ghee).



(ii) Write any two uses of acetylene.

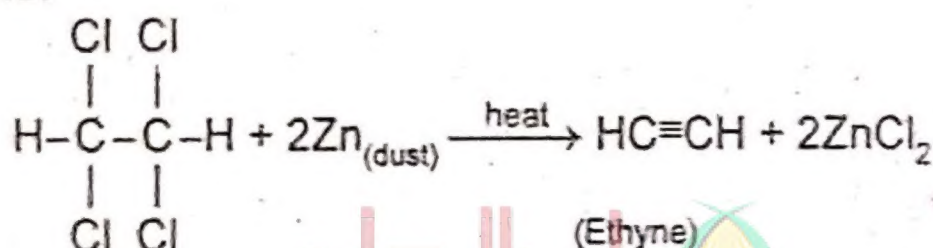
Ans Following are the two uses of acetylene:

1. Acetylene produces oxy-acetylene flame with oxygen. It is a highly exothermic reaction. Heat released is used for welding purposes.
2. Acetylene is used to prepare other chemicals, such as alcohols, acetaldehyde and acids.

(iii) Write dehalogenation of tetrahalides.

Ans Dehalogenation of Tetrahalides:

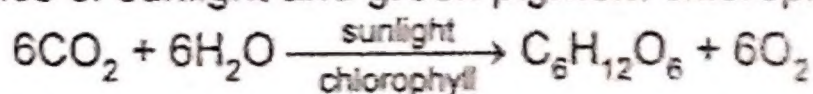
When alkyl tetrahalides are heated with Zinc dust, the elimination of halogen atoms takes place to form ethyne.



(iv) How plants synthesize carbohydrates?

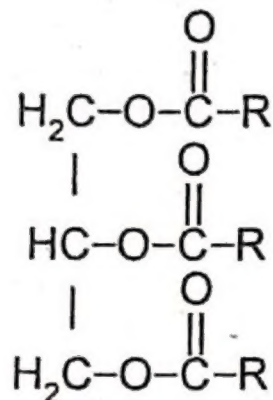
Ans Carbohydrates are macromolecules defined as polyhydroxy aldehydes or ketones. They have general formula $\text{C}_n(\text{H}_2\text{O})_n$.

Carbohydrates are synthesized by plants through photosynthesis process from carbon dioxide and water in the presence of sunlight and green pigment chlorophyll.



(v) Define lipids also write general formula of triglycerides.

Ans Lipids are macromolecules made up of fatty acids. Lipids include oils and fats. Oils and fats are esters of long chain carboxylic (fatty) acids with glycerol. These esters are made of three fatty acids, therefore, they are called triglycerides. General formula of triglycerides is as under.



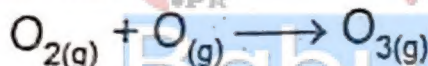
(vi) Differentiate between pollutants and contaminants.

Ans Difference between pollutants and contaminants:

Pollutants	Contaminants
Pollutants are the substances which cause pollution.	Contaminants are the substances that make something impure.

(vii) Write chemical reaction occurring in the mid-stratosphere.

Ans The mid-stratosphere has less UV light passing through it. Here O and O₂ recombine to form ozone which is an exothermic reaction. Ozone formation in this region results in formation of ozone layer. Thus, ozone layer exists in mid-stratosphere.



(viii) What is Ozone hole?

Ans A single chlorine-free radical released by the decomposition of CFCs is capable of destroying up to many lacs of ozone molecules. The region in which ozone layer depletes is called ozone hole.

4. Write short answers to any FIVE (5) questions: (10)

(i) Describe the two effects of using polluted water.

Ans Two effects of using polluted water are:

1. It is hazardous to human health. Drinking polluted water can cause cholera, typhoid and diarrhoea.

2. The use of polluted water is not only devastating for people but also for animals and birds.

(ii) **What is the jaundice?**

Ans Jaundice is caused by an excess of bile pigments in the blood. Liver ceases to function and eyes turn yellow. Patient feels weakness and fatigue.

(iii) **Which diseases are caused by acute cadmium poisoning?**

Ans Acute cadmium poisoning causes high blood pressure, kidney damage and destruction of red blood cells.

(iv) **How decaying plants consume oxygen?**

Ans The phosphate salts present in detergents cause rapid growth of algae in water bodies, which floats over the surface of water. These plants ultimately die and decay. Decaying plants being biodegradable consume oxygen gas present in water. Thus, depletion of oxygen gas results in death of aquatic life.

(v) **Define ores.**

Ans Those minerals from which the metals are extracted commercially at a comparatively low cost with minimum effort are called ores of the metals. For example: Ores of copper are; copper glance (Cu_2S) and chalcopyrite (CuFeS_2).

(vi) **What is smelting?**

Ans It is further heating of the roasted ore with sand flux and coke in the presence of excess of air in a blast furnace. It is highly exothermic process, therefore, a small amount of coke is required in the process. In the process, first ferrous sulphide oxidize to form ferrous oxide which reacts with sand to form iron silicate slag (FeSiO_3). It being lighter rise to the top and is removed from the upper hole.

(vii) **What is electromagnetic separation?**

Ans Electromagnetic separation is based on the separation of magnetic ores from the non-magnetic impurities by means of electromagnets or magnetic separators.

(viii) Write the name of two urea manufacturing units.

Ans The urea manufacturing units are:

1. Reaction chamber
2. Evaporator

(Part-II)

NOTE: Attempt any TWO (2) questions.

Q.5.(a) Write any five uses of bases. (5)

Ans Following are the five uses of bases:

- (i) **Sodium hydroxide** is used for manufacturing of soap.
- (ii) **Calcium hydroxide** is used for manufacturing of bleaching powder, softening of hard water and neutralizing acidic soil and lakes due to acid rain.
- (iii) **Potassium hydroxide** is used in alkaline batteries.
- (iv) **Magnesium hydroxide** is used as a base to neutralize acidity in the stomach. It is also used for the treatment of bee's stings.
- (v) **Aluminium hydroxide** is used as foaming agent in fire extinguishers.

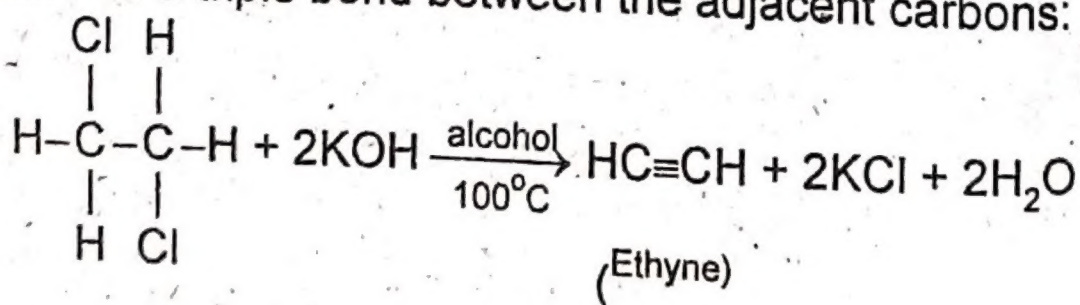
(b) Write two methods of preparation of alkynes. (4)

Ans Preparation of Alkynes:

Alkynes are prepared by the following two methods:

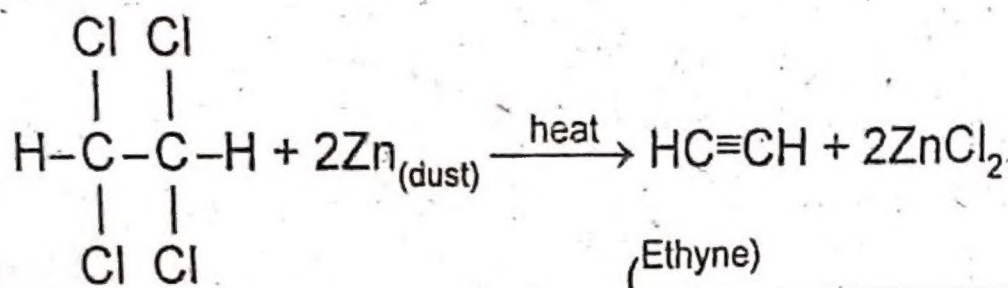
1. Dehydrohalogenation of Vicinal Dihalides:

When a vicinal dihalide is heated with alcoholic KOH, two hydrogen atoms along with two halogen atoms are removed from two adjacent carbon atoms with the formation of a triple bond between the adjacent carbons:



2. Dehalogenation of Tetrahalides:

When alkyl tetrahalides are heated with Zinc dust, the elimination of halogen atoms takes place to form ethyne.

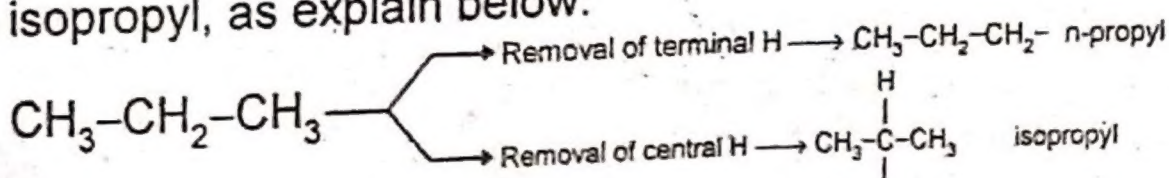


Q.6.(a) How alkyl radicals are formed? Give name and formulae of any four alkyl radicals. (5)

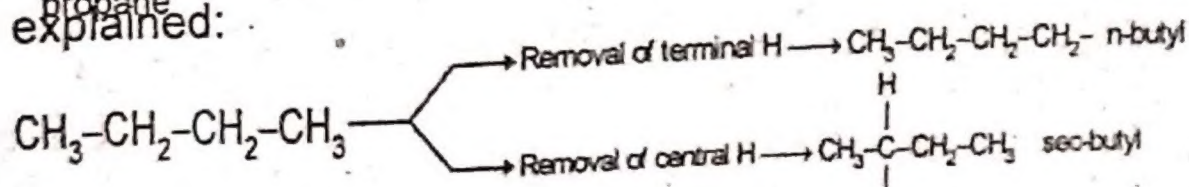
Ans Formation of Alkyl Radicals:

Alkyl radicals are derivatives of alkanes. They are formed by the removal of one of the hydrogen atom of an alkane and are represented by a letter 'R'. Their name is written by replacing 'ane' of alkane with 'yl'. Their general formula is $\text{C}_n\text{H}_{2n+1}$.

It is better to explain the type of radicals of propane and butane. Propane has a straight chain structure. When terminal H is removed, it is called n-propyl. When hydrogen from central carbon is removed, it is called isopropyl, as explain below:

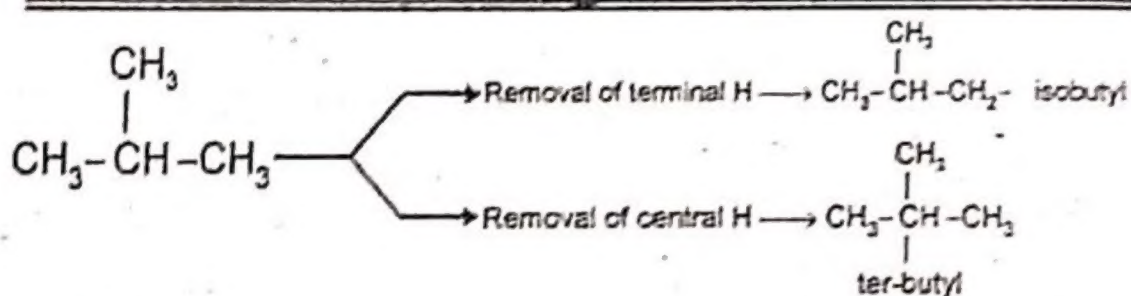


Similarly, different structures of butyl radicals are explained:



butane

propane

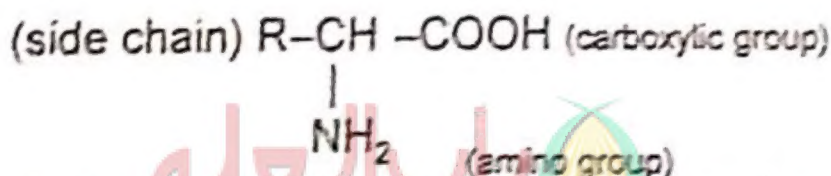


Alkyl radicals:

1. Methyl radical ($\text{CH}_3\cdot$)
2. Ethyl radical ($\text{C}_2\text{H}_5\cdot$)
3. Propyl radical ($\text{C}_3\text{H}_7\cdot$)
4. Butyl radical ($\text{C}_4\text{H}_9\cdot$)

(b) Explain that amino acids are building blocks of proteins. (4)

Ans Amino acids are organic compounds consisting of both amino and carboxyl groups. They have the general formula:

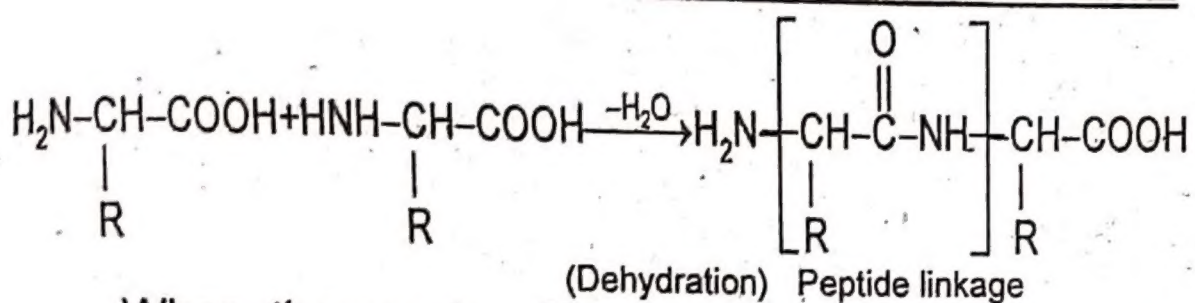


Side chain 'R' is different for different amino acids. There are 20 amino acids.

Ten out of twenty amino acids can be synthesized by human body. These amino acids are called non-essential amino acids. While the other ten which cannot be synthesized by our bodies are called essential amino acids. Essential amino acids are required by our bodies and must be supplied through diet.

Amino acids are Building Blocks of Proteins:

Two amino acids link through peptide linkage. Peptide linkage (bond) is formed by the elimination of water molecule between the amino group of one amino acid and carboxyl acid group of another, such as:



When thousands of amino acids polymerize, they form protein.

Q.7.(a) Give the characteristics of troposphere. Why temperature decreases upward in this sphere? (5)

Ans **Troposphere:**

The major constituents of troposphere are nitrogen and oxygen gases. These two gases comprise 99 % by volume of the Earth's atmosphere.

Although concentration of carbon dioxide and water vapours is negligible in atmosphere, yet they play a significant role in maintaining temperature of the atmosphere. Both of these gases allow visible light to pass through but absorb infrared radiations emitted by the Earth's surface. Therefore, these gases absorb much of the outgoing radiations and warm the atmosphere. As the concentration of gases decreases gradually with the increase of altitude, correspondingly temperature also decreases at a rate of 6°C per kilometre. This is the region where all weathers occur. Almost all aircrafts fly in this region.

(b) How polarity of water molecule plays its role to dissolve the substances? (4)

Ans For Answer see Paper 2021 (Group-I), Q.7.(b).